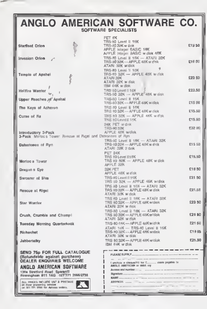


POPULAR
Computing
WEEKLY
3 June 1982 Vol 1 No 7
30p
The Black Hole
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Programs should whenever possible be computer printed.
At present we cannot guarantee to return every submitted article, so please keep a copy.

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, though we will always try our best to make sure programs work.

This Week

Editorial

Most schools in the country must know by now about the various Government microcomputer support schemes.

The most ambitious of the Government's aims is to see a microcomputer installed in every secondary school by the end of this year.

To this end it has been offering to pay half the cost of each computer bought. But most of the computers approved under the scheme are expensive and by now largely obsolete.

The other half of the Government's campaign is Information Technology Year 82, a project supposed to stimulate public awareness. But ITY seems to have died of inertia less than half way through.

Many teachers must have realised by now that if they want to equip their pupils for a computing future they will have to do it on their own initiative.

The only way to keep up is to go out and buy a computer now. Schools cannot afford to wait for the Government and local education authorities to catch up!

Next Week



It's a drab, drab world till you add a little colour with your BBC Micro. Paint the town red, blue, yellow ... the choice is yours!

Classified

ZX81 WITH 16K RAM [illegible] All original packing. £70. Tel. 01-[illegible] days 01 771 6814 evenings (Croydon).

ZX81 WITH 16K plus two tapes, only £70. Tel. [illegible].

VIC-20, cassette deck, [illegible] ROM cassette [illegible], only £205 [illegible]. Tel. [illegible] 6—8 pm.

C2M [illegible] and cassette [illegible] box, [illegible] offers. Tel. 051-[illegible] (Liverpool).

VIC-20 and VIC cassette plus [illegible] games, cost £270. [illegible] offer secures. Tel [illegible].

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ZX81 EDUCATIONAL SOFTWARE. Brush up on your [illegible] and French. Three (16K) programs of generated maths questions plus cassette plus [illegible]. Three (16K) programs of French grammar [illegible] plus [illegible] (16K) programs of [illegible] £4.50 [illegible] or send [illegible] for catalogue to: Rose Cassettes, 148 Widney Lane, Solihull, West Midlands [illegible].

ZX81 PLUS 16K MEMOTECH 2000 plus [illegible] Guarantee. £[illegible]. Tel. 01 [illegible].

VIC-20 COMPUTER, cassette deck, programmers [illegible], Introduction [illegible] (1) joystick, software. £[illegible]. Tel 01 [illegible] 9874.

ZX81 [illegible], 16K, [illegible], books, Chess Defender etc. Only £100. Tel. [illegible].

ATOM USERS Interesting new range of hardware for the Acorn Atom, please send sae for full details. Foundgate [illegible] Knighton, Powys. Tel. 05477 273.

ZX81 16K [illegible], 5 months old, books, [illegible] and books £100. Tel. [illegible] after 6 pm.

ZX81 16K VDG [illegible] and 8 books £100. Phone Worthing [illegible].

BBC MICRO A/C Invaders + [illegible] and Dungeons. All new on board A or B using [illegible] and cassette. Three programs on one cassette £4 cassette. From [illegible], [illegible] Avenue, Fleetwood, Lancs FY7 8PA.

ZX81 WITH 16K RAM, as new, plus four Sinclair [illegible]. Phone Davies [illegible] daytime.

FOR SALE. 4K ROM 2000. First offer over £30 secures, including [illegible]. [illegible], 4 Clifford Crescent, Newport [illegible].

ZX81 4K RAM [illegible] earlier [illegible] £120 will [illegible] £65. Phone 021-[illegible] evenings.

ZX81 16K PROGRAMS, 2 [illegible], 4 games, [illegible] £5.75 each. SAE details. M. [illegible], 8 Lawson Close, Aldridge, Walsall WS9 [illegible].

ZX81 16K. PAYE TAX PROGRAM based on "What Tax Guide". Check last years tax, calculate this years tax and [illegible] salary tax, N.I. and superannuation deductions. Updatable at next budget. Extensive notes. Dr Wilkinson, 57 Osbaldwick Village, York YO1 3NP. £5.95.

ZX81 BLEEP [illegible] [illegible] improve your keyboard cheaply [illegible] Simple plug-in, no soldering connections. Aids faster more accurate programming. £6.95, cassette instructions, P&P+VAT. [illegible] Dept. W [illegible] Lane, [illegible], W Sussex.

ZX81 16K COMPUTER, [illegible] and [illegible]. Tel [illegible] evenings.

VIC-20 for £130 including presentation cassette and [illegible] and lots more. 57 Worcester [illegible], Oldham, Lancs OL9 7SE.

[illegible] 48K, cassette, Basic, £[illegible]. Some [illegible]. Tel. 01-[illegible] 5475 evenings.

ZX81 16K plus many program cassettes, [illegible], finance, adventures, [illegible] £100. Tel 021-[illegible] 5734.

ACORN ATOM, 16K+12K. Class, monitor, cassette [illegible]. Tel [illegible] (evenings only).

SINCLAIR ZX81 plus 16K RAM, [illegible] five months old, £[illegible] ono. Tel Hastings 793875 after 5 pm.

ACORN ATOM, 8K ROM plus 12K RAM. Hardly used, superb condition, PSU [illegible] etc. £190 ono. Tel [illegible] (STD [illegible]) [illegible].

VIC-20. Six months guarantee left, £140 ono. [illegible] Lane, Weston-super-Mare.

ZX81 16K. Complete, six months old. Tel Kingston St Mary [illegible].

ZX81 16K plus seven [illegible] cassettes including [illegible], £75. Tel 01-[illegible] 4356.

PET COMPATIBLE COMPUTER to cassette leads. Type (1) [illegible] 3.5mm [illegible] and one 2.5mm plug. Type (2) 5-pin DIN, £4.50 each — [illegible] Applied, 4 Dromore [illegible], [illegible], Co Antrim [illegible].

[illegible] 16K RAM, 8 K ROMs, cassette [illegible] keyboard [illegible], [illegible] books including cassette and ZX81 assembler £100. Luton 41 340.

VIDEO GENIE COMPUTER, 3 months old and programs £[illegible].

ZX81 Two 16K games [illegible] cassette [illegible] guaranteed. Includes "Destroyer" [illegible] £[illegible] (including p&p) P Carr [illegible], [illegible] Norfolk.

ZX81 1K [illegible], two months old, for sale. £[illegible] [illegible] Grange, Morpeth, Northumberland [illegible].

ATARI 400, cassette, joysticks, manuals, complete, as new. £[illegible] Star Raiders £[illegible]. Phone 461 1464.

16K ZX 81 with keyboard, 2 [illegible] cassettes and 8 [illegible], £[illegible] ono. Ring [illegible].

ZX81 16K plus push button keyboard learning lab. Startrek, [illegible] and saving, £[illegible]. Tel. 0630 [illegible].

FREE CATALOGUE of [illegible] ZX81 programs, many available as [illegible] listings. Send large SAE to Aquarius Software, 55 [illegible] [illegible] Road Bath [illegible].

SINCLAIR ZX81 16K RAM, [illegible] cassettes, 2 [illegible] perfectly, very good condition, £[illegible] ono. Ipswich 713[illegible].

ZX81 16K plus [illegible] Graphic Rom + [illegible] £100. Tel 021 748 6471.

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Other end of the Spectrum?

Micro APL, which launched its Spectrum microcomputer last September, is concerned about possible confusion between its product and the new Sinclair ZX Spectrum.

Micro APL did not register the name because it was advised that the name was too common to be accepted as a registered trade mark.

Now the company is getting enquiries from customers who are confusing the two machines.

The two Spectrums appear to have little in common. Sinclair's ZX Spectrum is, at £125, the lowest priced colour and sound machine. Micro APL's Spectrum is a 16-bit multi user multi task APL machine aimed mainly at the business market with a basic price of around £10 000.

However Micro APL is considering ways of clarifying the differences between the two micros. One solution would be to publish advertisements highlighting the features of the different Spectrums.

Micro APL emphasises that there are no hard feelings and is in friendly communication with Sinclair Research.

EEC looks for new teletext

[illegible] funding for a [illegible] group.

[illegible] London [illegible] with Italian General [illegible] been given [illegible] at the possibility [illegible] teletext [illegible] tv. The [illegible] investigate the [illegible] in the [illegible] full-channel [illegible]

[illegible] satellite and [illegible] possible the use [illegible] channels for [illegible] the eight [illegible] that are [illegible]

In this way a much greater volume [illegible] could be transmitted and with cable tv a return signal would be possible, enabling interactive teletext.



Design Council picks the ZX81 for award

Sinclair's ZX81 is the first home computer to win a Design Council Award.

Judges for the 1982 awards praised Sinclair for bringing computers within reach of the general public. The panel concluded: "The price and easy-to-follow instructions mean that every member of the family can have the opportunity to learn about computers and how they are programmed."

The award comes as Sinclair Research reports sales of over 20 000 units per week to America.

At the same time an exhibition of micros and their uses — called Info Information, has been mounted jointly by the Design Council and Information Technology 82. At the Design Centre in London's Haymarket it features many micros including the ZX81, BBC Model B and the new Osbourne 1. The display concentrates not only on the hardware but also on the wide ranging applications of micros — in the home and at work — and their use in, for example, medicine and tele-communications.

The exhibition runs until June 26 and entry is free.

Now: the fully equipped remote control household

Stripeland Electronics & Photo Systems have introduced a range of control units enabling micros to program the operation of domestic appliances by remote control.

The system comprises the user's own host micro, one TX008 interface and up to 32 remote receiver units.

Instead of direct wiring from the TX008 unit to the appliance, which could be a tv, radio, lighting or even motorised curtains, the Stripeland system uses the existing mains lines.

Richard Last of Stripeland told *Popular Computing Weekly* that he will shortly be selling a two way version of the system with built in memory at the remote point. The remote device would then be able to store information and send it back to the micro.

Further details from Stripeland, 111 Liverpool Road, Formby, Merseyside L37 6BR.

Scotland gets first micro show

Edinburgh ZX Computer Club is to hold a one-day show on July 24. More than 50 stands are planned for this, the first micro show of its kind in Scotland.

Organiser Gordon Hewit told *Popular Computing Weekly* [illegible] the time was right for such a show.

The ZX [illegible] will be at Meadowbank Stadium open from 10am to 6pm.

Further details from Gordon Hewit, 3 Baberton Mains View, Edinburgh EH14 3ER.

Commodore show is on

Britain's fifth summer weekly for micro owners, *Popular Computing Weekly* will be at the Cunard Hotel from June 3 to 5 for the 3rd International Commodore Computer Show.

With twice the space of last year's show — over 30 000 sq ft on both exhibition levels of the hotel — there will be 154 stands on display.

Displays will feature all the new Commodore products including the Vic 10, Vic 20 and Commodore 64, plus the Vic networking system from Datalect and IT '82.

The show is to be opened by Commodore International's Chief Executive, Jack Tramiel.

The venue is the Cunard International Hotel, Hammersmith, London. Entry is £1 and the opening times are: June 3, 12am to 6pm; June 4, 10am to 6pm; and June 5, 10am to 5 pm.

You can find *Popular Computing Weekly* on Stand 140 on the lower floor.

IBM can't be too Personal

IBM still has no plans to introduce its Personal Computer to the UK.

The company now has an estimated backlog of 40 000 orders in the US and consequently no spare production to contemplate a UK launch.

Meanwhile Mick Punter, managing director of Microcomputerland, has been importing the IBM micro.

Microcomputerland gets round IBM's export restrictions through its purchasing links with Computerland, an IBM US distributor.

However Microcomputerland has reportedly been the subject of Fraud Squad enquiries and apparently a number of salesmen have been fired by Punter.

The IBM Personal Computer System is also being imported by KGB micros.

Contact Microcomputerland, 1 Prince's Street, Richmond, Surrey or KGB Micros, 14 Windsor Road, Slough SL1 2EJ.

Club Reports

Is your club involved in any special projects? Use this page to tell the world about it.

Three years on and it's still fun in Sunbury

***David Kelly** visits Sunbury-on-Thames Computer Club and talks to its founder*

They're such a casual lot in Sunbury. Not for them the establishment rigours of membership fees, news sheets and tutorial meetings. Though founder Simon Taylor originally planned that the club should take that sort of direction, the members unanimously decided against such formalities and instead created a regular weekly meet in the pub to offset the formality of their monthly meeting in St Benedict's Church Hall in Ashford.

A lot has happened in the three years since the club was formed and Simon heartily points out that it's been a long time in the world of micros.

Nowadays he's making a name for himself as creator of the game *Blitz* which Commodore have contracted to market, and as a software programmer for Micrógen and also writing programs for the new Sharp PC-1500. At 18 he's a budding expert quite naturally at home in one of the more computer clubs in Britain.

It all started just after he left school. First he saved for a Mark 14 Sinclair's first micro and began learning machine code. Then when a friend bought a Nascom I kit he decided to try to get in touch with other micro enthusiasts in and around Sunbury.

As so often happens it was a letter in a magazine which really set the ball rolling. Simon got 10 letters and promptly organised meetings. He kept a list of names and addresses and every month someone would volunteer their house for the meeting. Everyone brought along their machine and exchanged ideas and programs.

Simon Taylor — a budding expert

They would meet on the first Friday of the month, bringing quite a variety of micros — Mark 14s, Nascoms, a Triton, Paysonp 80s, an Elector Junior and an Aim 65. Most of the machines operated only in machine code and if your machine understood a high-level language then that was really something!

Over the next eight months the club grew rapidly with new members joining every month.

This arrangement ran into difficulties when more than 50 people, each with their machines, turned up to the December 1980 meeting. The problem was no longer how to plug in all the micros but how to get all the members in through the front door! This was to be the last meeting of that type — just meeting in each other's homes was no longer practical.

The three people most involved in the running of the club at this time, Simon Taylor, Andy Lawrie and Stephen Battle, felt the club needed a formal set up — with membership fees, a newsletter and expertly lectures and tutorials.

They set out their ideas in a letter but the response from members suggested the most important feature of the club was its informality. To have a rigidly constituted group would be to destroy what the club stood for — a friendly meeting of people with a common interest. So it was decided to carry on, but to let the club, as far as possible, govern itself.

Over the next four months they had no meetings at all while Simon searched for a suitable monthly venue. At last he found St Benedict's Church Hall in Ashford and in April 1981 they met again for the first time in the hall.

Since then Sunbury Computer Club has met on the last Tuesday of every month and the air of informality is maintained. Simon keeps no list of names and addresses of those who attend and can only estimate that the membership is stable at somewhere around 80. In his own words "It is just a place where interested individuals can go and talk and exchange ideas".

He reckons that within the membership they must have at least two of every popular computer (except, strangely, the PET) and can provide help and advice on just about any machine.

The club also meets every week in the pub 50 yards from Simon's house — The Grey Horse.

As the club has developed so has Simon's involvement in micro-computing. Together with Micrógen he plans to produce a monthly cassette-based user club magazine which should appear before the end of the summer.

All this, together with his full-time apprenticeship and his work for Sunbury Computer Club keeps Simon very busy — he admits he doesn't know where he finds the time. Simon's advice is never to forget the Sunbury Club's motto — Per ardua ad error!

Sunbury Computer Club meets at 8 pm in St Benedict's Church Hall, Napier Road, Ashford, on the last Tuesday of each month. The next hall meeting will be at 8 pm on June 29. On the other Tuesdays of each month the club meets for a drink and a chat at 8 pm in the Grey Horse, Staines Road East, Sunbury-on-Thames.

Further details from Simon Taylor, 8 Priory Close, Sunbury-on-Thames.

We want to hear from you!

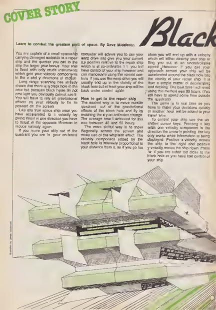
Whether you are starting a new club, holding a special meeting or just changing the venue, we want to hear from you.

Write to David Kelly, Club News, *Popular Computing Weekly*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF or call him on 01-930 3271

For your diary

Norwich and District BBC Micro-Computer User Group meets twice-monthly with workshops and talks in Norwich City College. Contact Paul Beverley, Room B12a, Norwich City College. (Tel 0603 60011 ext 236)

Mid-Cheshire Computer Club meets on the second Friday of each month in the main Winsford Library (in the Town Centre Precinct) at 7.30 pm. Contact Dave Clare, Providence House, 222 Townfields Road, Winsford, Cheshire CW7 4AX. (Tel Winsford 51374.)



Black

Learn to combat the greatest peril of space. By Dave Middleton

You are captain of a small spaceship carrying damaged androids to a repair ship and the quicker you get to the ship the larger your bonus. Your ship is fitted with only crude instruments which give your velocity components in the x and y directions of motion.

Long range scanning has already shown that there is a black hole in the area but because black holes do not emit light you obviously cannot see it. You will have to rely on gravitational effects on your velocity to fix its position on the screen.

Like any true space ship once you have accelerated to a velocity by giving thrust in one direction you have to thrust in the opposite direction to reduce velocity again.

If you move your ship out of the quadrant you are in, your on-board computer will advise you to use your warp drive and give you your current x,y position relative to the repair ship which is at co-ordinates 1 1. you still have control of your ship however and can manoeuvre using the normal controls. If you use the warp drive you will usually end up in the vicinity of the black hole but at least your ship will be back under control again.

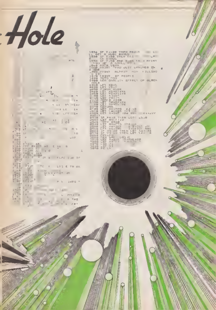
How to get to the repair ship

The easiest way is to move outside quadrant out of the gravitational effects of the black hole and fly by watching the x y co-ordinates change. The average time I achieved for this was between 45 and 55 hours.

The more skilful way is to move diagonally across the screen and make use of the whiplash effect. The velocity component added by the black hole is inversely proportional to your distance from it, so if you go too close you will end up with a velocity which will either destroy your ship or fling you out at an uncontrollable speed. However if you get your approach correct your ship will be accelerated around the black hole into the vicinity of your repair ship. It is then a simple matter of decelerating and docking. The best time I achieved using this method was 30 hours. (You still have to spend some time outside the quadrant)

The game is in real time so you have to make your decisions quickly or another hour will be added to your travel time.

To control your ship use the unshifted cursor keys. Pressing a key adds one velocity component in the direction the arrow is pointing; the key only works while information is being displayed. Positive x velocity moves the ship to the right and positive y velocity moves the ship down. Press 'w' if you are either too close to the black hole or you have lost control of your ship.


Hole

Reviews
software



Missile Command

Available from Hi-Tech, or any Commodore Vic Dealer. Price £8.75

All right, I admit it: I'm hooked! Another reproduction of a popular arcade game, this requires an additional 3K of RAM before the action can commence. It can be played using either the keyboard or a joystick, and a joystick is certainly to be preferred. Using the keyboard tends to get your fingers tied up in knots as you desperately try to press nineteen keys at the same time.

The game takes a while to load, as there is one setting up program before the main one comes in. Having selected keyboard or joystick control, sit back and wait for a few minutes while the second program is loaded. Once you've got them, you're in for a frantic time! You are defending five cities which are under siege by missiles raining down from above. The method of defence is quite ingenious: you control a set of sights which race about the screen at breakneck speed (they need to). When the sight is in an appropriate position, usually just in front of one of the missiles coming down, pressing the fire button launches a counter missile of your own aimed at your sights. When it gets there, explosions occur, and the ensuing debris wipes out any enemy missiles which blunder into it.

However, any of the missiles which get through your defences are more than capable of wiping out a city if they score a direct hit, and when all your cities go ...

To score you must demolish the enemy missiles and use as few of your own missiles as possible, since you get points for any that remain after a particular attack wave is completed. The missiles come down in droves, and every wave gets successively more frantic, with seemingly hundreds pouring down at a time. There is a way of surviving this which entails setting up a line of your own missiles across the bottom of the screen and hoping that the enemy missiles run out before your own do.

Summary

An extremely addictive game and a fairly good reproduction of the existing arcade game. This is a difficult one for manufacturers to tackle as the original game had a very novel way of moving your sights across the screen, and one which is not reproducible on any microcomputer. The efforts that Hi-Tech have put into being as faithful to the original as they could, considering the limitations imposed upon them, are commendable. A very good game. **PG**

Party Tricks

Video Software, Stone Lane, Kinver, West Midlands. ZX81 1K cassette. Price £4.95

So Video Software, long a supplier of sophisticated up-market 16K software for small businesses and farming, is lowering its sights! They have just launched this cassette containing ten BASIC 1K routines and promise more.

The kind of party they're aiming at is for children. I think introducing something different for children's parties is a major cause of ulcers in certain circles — to have a ZX81 play session can't be bad.

However, there are doubtless plenty of adults who will enjoy much of the material here, even if the overall novelty is not in the same league as that of, say, the Orwin packages or the 'adult' games from Automata.

Video Software shows rather poor marketing in putting the least exciting programs first. We have *Shoot* — where you are taking a penalty which the goalie has to try to save; *Sketch* — differing from the million other sketch-a-sketches only by having a SAVE facility; *Name The Day* — giving weekday for any date; and *Train* — you drive a train (in forward or reverse gear) on a track.

These are all fairly good, even if hardly world shattering. Later programs are better. They include *Ongar Wonger* (a pie face-drawing routine), *Weather* (a variant on the random poetry genre), *UFO* (under down the single space invader), *Who Shot JR?* (ZX81 Cluedo), *Field-Gun* (a nice target practice game), and *Follow* (you must poke the micro's wiggly path across the screen).

Video Software's well known high quality of presentation is used with this 1K package.

For your money you get a good cassette with a set of eaves on standard and an impressive 26-page booklet.

Summary

Near top marks for this selection of 1K ZX81 programs — fun for all and useful for those struggling to get into Sinclair BASIC. **KJL**

Jungle Maths

Scisoft, 5 Minster Gardens, Newthorpe, Eastwood, Notts. ZX81 16K cassette. Price £4.50

It was with a great thrill of anticipation that I prepared to load this package. There is not much material yet for ZX81 teaching and a huge need. Scisoft's material is nicely packaged but less costly and comes with a separate four page leaflet.

But the thrill soon died down. The leaflet has been hastily and poorly written — there are ten grammatical errors in the eleven-sentence description of the material, for instance. And the recording quality on the cassette is very reminiscent of what we had to put up with nine months ago — the signal on one side was so weak that loading was impossible; that on the other was not quite as bad, but still bad.

Such lack of attention to detail is bad practice in any kind of software. It is not at all excusable where children's learning is concerned.

The hallmarks of tar are missing throughout the program that I loaded so well — slow reaction to key presses, punctuation marks missing, poor screen layout, generally inappropriate language, inadequate mugtrapping.

There are matters too that any competent maths teacher would frown on: severely inadequate restrictions on the questions posed, use of the "less than" symbol, involved use of the word "devise".

All this is a great pity. Scisoft had a lovely idea — why, oh why, didn't they carry it right to the end before rushing to the market place?

The lovely idea is of course to link the educationist's need for drill programs to the child's need for games.

In *Jungle Maths* you must move across the screen avoiding a (rather strange) collection of hazards by answering the posed questions correctly.

Type of question (from the four rules), range and type of numbers involved and time limit may all be selected during the initial stages.

The hazards involve rather laborious moving graphics, but the children enjoyed them (despite their horrific nature) — they probably can't readily be improved without machine code. All the same, tar needs application to the BASIC coding generally.

Summary

An excellent idea — parents and teachers need this kind of program. It is a great pity that the authors haven't worked a bit longer on the coding. It is to be hoped that a polished version will soon appear. **KJ**

Beebox

Available from Beebox Limited
Price £220 plus VAT

This neat, compact unit which sits underneath your Vic is designed to give you a 40 column by 25 line display and increase the amount of available memory from 3K to 32K. It connects up to the expansion socket on the Vic but has a further socket of its own so nothing is lost and quite a lot gained.

All this sounds very impressive but is it as good as it's cracked up to be? The company's description creates the impression that a true 40 × 25 screen area is available on which you could merrily program impressive graphics for anything from arcade games to word processing packages. Not so.

On connecting up the unit and powering it all up you have lost the traditional 'window' screen display of the Vic and the whole screen is there for you to marvel at. This is somewhat reminiscent of the old Commodore Pet 4032 display. The old Vic appearance is not all you've lost however. Also gone are the Vic graphics and indeed just about everything you've become familiar with. In their place is the Prestel character set which in its defence is quite impressive and a variety of other control characters. For some reason best known to Beebox, actioning these involves positioning them on the screen, thus losing some of the much valued 40 × 25 area.

These control characters include a facility to produce double height characters, flashing characters and so on. What you can't do is alter the background colouring: you start off with white on a black background and black it will remain whatever you try and do about it.

One further unfortunate feature is that you cannot revert to the ordinary Vic screen once that board is wired up. To get back into Vic mode you have to disconnect everything and start again. It would have been nice to be able to swap from one to the other at will.

On the plus side, the colour quality looks distinctly better than on a normal Vic although there is a slight shimmer when scrolling through a listing.

Summary

It does give you an extra amount of memory and all told is probably fairly cheap for an additional 29K of RAM and a 40 × 25 display area, even if it is only a display area. At £220 it will probably be of most use to the businessman who wants to use a larger area (for say stock control or whatever) but for the average hobbyist I would say that it's a waste of time. **PG**

20 Simple Projects

By Stephen Adams, published by Interface, 44-46 Earls Court Road, London W8. Price £4.45

This is the latest offering from the Interface publishing house that specialises in books for home computer users, in particular Sinclair users.

Author Stephen Adams is well-known in the microcomputer world as the man who knows his way around Sinclair hardware and who has had much of his work published in the microcomputer press. The idea of this book is a good one: microcomputer hardware projects being a subject not often covered in magazines.

Adams makes no claims about the quality of his projects, each being the cheapest and simplest way of performing a task, not necessarily the best. For this reason the book deserves praise as a source of ideas or questions rather than answers. Adams has provided you with the route: it's up to you to explore it.

Some of the projects are specific to the ZX81 but not so many that other computer users will feel left out. The circuit diagrams use a non-standard series of symbols but are clear enough. As in other Interface books there are a lot of pictures that have no relationship with the text — an interesting quirk. One other point I find most annoying is the liberal use of upper case letters throughout the book.

It should be remembered that books of this nature are not judged by the quality of their production but by the information they contain and this book contains a fair amount of that. The construction projects contain a minimum of software concentrating on the electronics.

Among them are a tape recorder control which every computer user will find handy, a light pen which is the ultimate in low technology and an analogue to digital converter. **SA**

ZX81 EPROM board

EPROM Services, 3 Westgreenwood Drive, Leeds LS8 1EF. Tel: 0532 667183
Prices: board £17.50 including p&p; EPROM £3; also blank programming them £2/K

This printed circuit board comes ready made to connect up to your ZX81 and provide it with your own commands, stored as subroutines in a ROM.

The type of ROM used is called an EPROM which means it can be erased by ultra violet light and reprogrammed.

The board can take four 2716 (+5 volt type) EPROMs and connect up to the 16K pack as well.

The EPROM can be programmed by you or the company which supplies the board. EPROM Services supply the complete service, blowing the EPROM and reprogramming it from your machine code listing. The advantage of using this method of program storage is that no RAM is used up and the program is still safe in the ROM when the power is switched off.

The space allocated to the EPROMs on the board is 8K to 16K in the memory map, but due to the fact that only one IC is used to decode the address it also appears in the 40K to 48K section as well. This means that you are limited to 16K of RAM as the Sinclair ROM takes up the space from 32K to 40K.

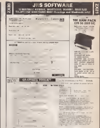
The instructions for inserting the EPROMs are easy to understand and include instructions on how to alter the board so that it can take 6116 RAMs instead.

The board arrived with an EPROM containing seven machine code routines in the first 2K socket. They were RENUMBER (in steps of 10, starting from 10, but with no GOSUBs or GOTOs altered), FREE MEMORY, PROGRAM LENGTH, MEMORY LENGTH, FILL (fills the screen with the character selected).

The last two convert decimal numbers POKEd into the system variables to hexadecimal numbers printed on the screen. There were a couple of errors in the last two due to address changes being made but not clearly explained. The address changes were 16614-16616 to 16507-16608.

This EPROM board could be very useful on saving RAM if you can write your own routines in machine code (EPROM Services intend to make more programs available soon).

It does however restrict the amount of RAM you can use and as a number of boards that plug into the same address space, you will be limited as to what sockets you can use. **SA**





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Open Forum

Open Forum is for you to publish your programs and ideas
It is important that your programs are bug free before you send them in. We cannot test all of them
Contributions should be sent to Popular Computing Weekly, Hobhouse Court
19 Whitcomb Street, London WC2H 7HF

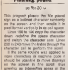
Flashing pound

on Vic-20

This program places the Vic pound sign as a defined character randomly on the screen and then scrolls it in pixel format vertically in its cell space.

Lines 150 to 190 copy the character down, redefine the space character and switch the character sets. Lines 200 to 240 move the bytes through the character cell to perform the scroll.

If the same routine was applied to more characters in machine code it should be possible to move displays on the screen in fine scroll, thus opening up interesting areas in the games and visual presentation fields.



YOUR PROGRAM COULD WIN A PRIZE!

Each week the editor goes through all the programs that you send to Open Forum in order to find the Program of the Week.

The author of that program will qualify for DOUBLE the usual fee we pay for published programs (the usual fee is £10)

Programs which are most likely to be considered for the Star Prize will be computer printed and accompanied by a cassette.

The programs will be well documented, the documentation being typed with a double spacing between each line.

The documentation should start with a general description of the program and then give some detail of how the program has been constructed and of its special features.

Listings taken from a ZX Printer should be cut into convenient lengths and stuck down on to white paper.

Please enclose a self-addressed envelope.

Cone
by Jeremy Rowntree

Cone

on BBC Micro

This program will run on a BBC Micro Model A or B in any available graphics mode. When RUN it will draw a random cone in 3D in the form of a moulded grid.

The screen colours are defined at Line 60: the 2 sets the foreground, ie plotting colour to green while the 7 sets the background, ie screen colour to white.

These numbers can be altered to give different colours: 1 — red, 2 — green, 3 — yellow, 4 — blue, etc.

Program notes

Lines 90-120 define a random ellipse centre A, B, major axis J, minor axis K. This ellipse is then plotted by Lines 130-160.

V and S define how the next ellipse relates to this one — V - vertical distance between them, S — amount by which ellipse shrinks — while I keep the ratio of the axes constant.

Lines 170-190 draw lines connecting the ellipses.

Line 220 adjusts the vertical step as the cone is plotted causing the shape to curve — with a − sign it curves inwards while with a + sign it curves outwards.

The STEP in Line 140 can be altered to give a more rapid plot (try PI/90) at the expense of resolution while altering the STEP in Line 170 will vary the spacing of the vertical lines.

Depth charge

on ZX81

In this program you command a frigate with a substantial supply of depth-charges. You must destroy the submarines which travel at various depths before five parts of the dam-wall are destroyed. The deeper the

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submarines are the more you score for hitting them

You can move your frigate with the 5 and 8 arrow keys. To drop a depth-charge you have to press 6. The submarines will continue to move even after you have dropped a depth-charge but with a more inconsistent movement.

To start the game from the instructions you have to press NEW LINE.

Program notes

Lines 1 to 10 set up the main variables. 15 and 16 set up the screen by calling a sub-routine at 1000.

Lines 20 to 250 make up the main body of the program.

Lines 270 to 295 make an explosion when the depth-charge reaches the lowest point it can move to and has not hit anything.

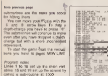
Lines 300 to 335 generate and move the submarine.

Lines 400 to 470 create an explosion and increment the score when a submarine is hit.

Lines 500 and 510 finish the program when five parts of the dam wall have been destroyed.

Lines 1000 to 1110 generate the screen display.

Lines 2000 to 2110 print out the instructions.





Depth charge
by Clive Canton



3D noughts and crosses

on Vic 20

The following program is not only for the Pet/Vic. It can be for anybody who owns a computer that can handle data statements — if not then the array will have to be put in as LET A(1) = 2 etc.

After every move the program first identifies all cells in a particular direction. It then determines the situation in that line by multiplying the cell values M(P1 R1 C1) together. finally it adds a value S to the priority values N(P1 R1 C1) for the cells in line. S depends upon the line situation determined previously, as you will see.

Figure 1 Illustrative game

For convenience plays are only considered on the top plane. The player moves first with O's inputting Plane Row Column. The program replies on all even numbered moves with X's. Note that on all its moves the program has a choice of several moves as cells N(P1 R1 C1) of the same value. After every move N(P1 R1 C1) is updated but only for cells in line with the move cell. Examination of each move in conjunction with figure 3 will make the process clear.

Note that N(P1 R1 C1) is updated even for already occupied cells, checks could be introduced to avoid that but the saving in time would probably not be very great.

Figure 1

MOVE	NEW Position	N(P1,R1 C1)			
start of game	. . . .	10	0	0	10
	. . . .	0	0	0	0
	. . . .	0	0	0	0
	. . . .	10	0	0	10
(1) 1,1,1	0 . . .	20	10	10	34
	. . . .	10	10	0	0
	. . . .	10	0	10	0
	. . . .	20	0	0	20
(2) 1,1,4	0 . . X	10	0	0	38
	. . . .	10	10	16	14
	. . . .	10	16	10	14
	. . . .	34	0	0	54
(3) 1,2,1	0 . . X	108	0	0	38
	0 . . .	118	20	34	34
	. . . .	134	16	16	14
	. . . .	104	0	0	54
(4) 1,4,1	0 . . X	10	0	0	128
	0 . . .	20	20	124	34
	. . . .	10	118	10	14
	X . . .	108	16	14	48
(5) 1,3,2	0 . . X	104	10	0	148
	0 0 . .	118	608	68	128
	. . . .	10	124	108	14
	X . . .	140	34	16	144
(6) 1,2,6	0 . . X	104	10	16	1130
	0 0 X .	20	180	1130	34
	. . . .	10	1128	108	14
	X . . .	1104	24	28	148

Figure 2 Top plane of cube

0,0,0	0,0,1	0,0,2	0,0,3
0,1,0	0,1,1	0,1,2	0,1,3
0,2,0	0,2,1	0,2,2	0,2,3
0,3,0	0,3,1	0,3,2	0,3,3

Figure 3 Priority values for line situations

Line situation	Line value A(n)	Priority value B(n)
0 . . .	3	10
X . . .	2	14
0 0 . .	9	20
X X . .	4	120
0 0 0 .	27	900
X X X .	8	1000
0 X . .	6	11
0 0 X .	18	20
X X 0 .	12	100

Note that the last three values of B(n) are used only at certain times. If a line was already blocked, neither B(7) or B(8) is used — line 5040. If 0X•• is preceded by 0••• S is set to −10 line 5030.

Figure 4 Computation of — D —

SITUATION IN LINE	0	•	0	•
VAL OF M(P1 R1,C1)	3	1	3	1
Value of D	3x	1x	3x	1=9

Program notes

The program has been written deliberately to be machine-independent and offers several opportunities for changes. Subroutine 2000 which draws the board after every move

could be revised using PEEK and POKE to give a static display.

If line 3050 is deleted the program will now play the same replies in a new game if the player repeats moves from a previous game. Various strategies can be examined to determine the program's weaknesses.

For an alternative game reverse the inequality signs in lines 3030 and 3040. The program will now play anti-noughts and crosses trying to avoid creating lines of four. Remember also to change lines 5000 and 5020. If lines 140-170 are deleted and this line is substituted

```
140 GOSUB 3000: PRINT PRINT "YOUR MOVE IS" PRINT P+1;R+1;C+1
```

The computer will take both sides and play itself. Experimentation is possible with the program playing both parts with different versions of B(n). If the losing values of B(N) are modified while the winning values are retained the program becomes self teaching and will eventually improve.

The values of B(0)-B(8) are not optimal and can be varied to change the program's play — the only changes required are in line 20.

With a few extra lines the value can be altered according to who is playing eg low values for XXX• and 000• when you play and very high when your friends play.

Please remember you input plane, row and column (P R C) as 1 1 1 not 111. Good luck!

Message scroller

on ZX81

The program asks you to type in a message. It then scrolls your message four letters at a time up the screen, enlarging each character eight times, forming an 8 × 8 matrix. A machine code routine is used to help speed the printing up.

Program notes

The program is divided into two sections: the first to enter the machine code (Lines 1-30), when this section of the program has been entered (take care to get line 2 exact) apparent rubbish will appear in line 1 — this is the machine code lines

to 3000 page

3D noughts and crosses
by Martin Burke

```
[illegible]
```

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2, 5 10 20 25 30 can then be deleted. Lines 40-155 can then be entered — this is the main program. In the program the two characters used for printing are a space and inverse space. You can change the characters by POKEing 16529 and 16536 with two new characters.

For example

```
POKE 16529 128
POKE 16536 0
```

will give inverse video character.

You can use the program to give a continuously repeating message by adding

```
200 GOTO 110
```

Message scroller
by Philip Haywood

Graph
by Stephen Read

Graph

on ZX81

This program draws and labels — as per example — including unplot (rub-out) options. Instructions are at the beginning so as not to interfere with plotting. Just copy the result from screen to printer for presentation.

For those whose ZX81 works for them!

Train race
by Eric Deeson

Train race

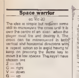
on BBC Micro

No way is this a novel game — two engines race across the screen moving forward a random step each move until one or other reaches the end. The principle is the basis of a number of similar exercises non-interactive or interactive.

It is straightforward to add twiddly bits like reverse as well as forward motion. Bothers ahe switching tracks (one reason I chose MODE 6 which gives you the "railway lines" for free).

Observe the BBC features of

- user-definable graphics (lines 10 70)
- calling procedures with different parameters (compare 150 170 240)
- sound for the "whistles" (line 250)



Space warrior

on Vic 20

The idea is simple but requires some skill to manoeuvre the cross until it is over the centre of an alien when the player must fire and destroy it. The cross can be manoeuvred in both vertical and horizontal directions with a repeat action so to avoid having to keep on pressing the same key to move it a few spaces. The keys I have chosen are

Z — left
C — right
V — down
G — up
M — fire

They may seem a little cluttered up but I assure you after only a few games they become no problem.

There are ten aliens which must be destroyed within the time limit. The player enters his time at the beginning of the program (4-10 min. this can be shortened or lengthened by changing one or two of the lines from 66-72).

The aliens are randomly positioned at the top of the screen and then come down the screen at totally random movements. The reaction from pressing a key to the movement of the cross is very good.

When or if the alien reaches a red border line then it disappears and another is generated. Also if the cross touches the border then it marks the end of the game.

The sound generators have been put to good use especially when an explosion occurs.

Space warrior
by Gerhard Walh

```
 1 PRINT"T"
 20 PRINT "  SPACE  WARRIOR"
 30 PRINT
 40 PRINT"NOK"
 50 PRINT "Z-LEFT  C-RIGHT  V-DOWN
 60 PRINT G UP  M-FIRE"
 65 PRINT "ENTER YOUR TIME 4-10"
 66 IFF=4THENS$="000400"
 67 IFF=5THENS$="000500"
 68 IFF=6THENS$="000600"
 69 IFF=7THENS$="000700"
 70 IFF=8THENS$="000800"
 71 IFF=9THENS$="000900"
 72 IFF=10THENS$="001000"
 75 PRINT PRINT PRESS A KEY TO START
 80 GETA$ IFA$=""THEN80
 90 TI$="000000"
 100 POKE36879 14 PRINT"T"
 101 ...
 110 FORI=1TO10
 120 ...INT 4*RND 1 ...+7680
 130 ...
 140 FORI=0TO... POKE7680+I 160
 150 FORI=0TO4... STEP...
 160 POKE7... +I 1... POKE... +I
 170 FORI=0TO... POKE... 160
 180 FORI=0TO4...STEP22
 190 POKE8163-I 160 POKE ... -I
 300 REM ALIEN
 305 GOSUB2000
 410 J=0 D=INT 19*RND 1 ... 7680
 411 POKE36876 0 FORT=1TO 1000 ...
 420 POKEO+J 50 POKEO+J+1 216 ...
 430 POKE36878 3 POKE36... 220
 435 FORT=1TO50 NEXTT ...
 440 POKEO+J 32 POKEO+J+1 ...
 450 V=INT 3*RND 1 +1
 452 IFV=1THENJ=J+21
 454 IF ...THENJ=J+22
 456 IFV=3THENJ=J+23
 460 IFPEEK O+J+1 =160THEN110
 462 IFPEEK ...+J... =160THEN410
 464 IFPEEK O+J-2 =160THEN410
 467 IFTI$ =S$THEN3000
 468 POKE 36876 0
 470 GOTO420
 1000 IFPEEK O+J+1 =81THEN1150
 1020 POKE36876 16 POKE36874 220
 1030 FORT=1TO50 NEXTT
 1040 POKE36874 0
 1060 RETURN
 1150 REM HIT ALIEN
 1151 POKE36876 0 FORT=1TO60 NEXT
 1160 POKE36878,15 FORM=1 TO... STEP...
 1170 POKE36876 M NEXTM
 1175 FORT=1TO200 NEXTT
 1180 POKE36876 2 POKE36877 220
 1181 FORM=15TO0STEP-1
```

Car race

on ZX81

The object of this game is to manoeuvre your racing car (shown as a multiplication sign) round the racing circuit in a clockwise direction without crashing into the barriers.

Every time a lap is completed the computer adds to your score and randomly places a number of obstacles on the circuit which you have to avoid.

As well as keeping your score the computer also keeps the highest score.

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Open Forum

```
[illegible]
... REM JUMP SHIP
[illegible]
... END
[illegible]
... END
```

from previous page

Program notes

The variables are as follows
S — Your score
HS — High Score
Y — Y co-ordinate of car
X — X co-ordinate of car
L — Number or points to be added to score
D$ — String which determines direction of car
Lines 10 — 460 print out the circuit
Lines 1000 — 1100 randomly place obstacles
Array D contains the set-up of the circuit

When the program is run the screen will go blank for approximately five seconds while the circuit is being printed

Listings taken from a ZX printer should be cut into convenient lengths and stuck down on to white paper. Please enclose a self addressed envelope

Car race
by Alasdair Sanderson

```
[illegible]
```

```
[illegible]
```

Vic-Orator

on Vic-20

This program which will run on an unexpanded Vic will utilise the facility of a user-definable character set to display double height characters on the screen, the visual equivalent of a shout. Ideal for group or display activities.

To write this program to fit into the limited space I have had to cheat a little and only produce 128 characters in the set so the user must be careful to not print any reverse characters (128 onwards) otherwise strange things may happen!

Vic owners with additional memory can get round this by setting up a 4K character generator and they will also need to change the top of memory locations that are poke-ed in lines 3, 4, 33, 34.

The character set used in the program is the upper case letters and graphics set. If you require upper and lower case letters the peek address in lines 10 and 11 needs to be changed to peek(34816+c)

The REMs are reasonably self explanatory

Corrections

A number of mistakes have crept into the programs published in the first issues of *Popular Computing Weekly*. We will print corrections as quickly as possible.

Here is a list of the corrections we have to date.

Vol 1 No 1 page 9
Space Amaze

Line 25 should be renumbered line 45.
Line 500 should read IF 0$= AND X>= THEN LET X=X+1
Line 4000 should read LET O(X,5)=0

Vol 1 No 2 Page 17
Squash

```
60 PROCset-up
130 PRINT CHR$(RND(6)+128) "sp" (TIME DIV 100) " seconds"
170 IF A$="Z" OR A$="M" THEN PROCmove-bat
500 PROCmove-ball
560 SOUND T+16, 15,RND(100)+100,366
340 DEF PROCset-up
550 PRINT TAB(50 T+18),STRING$(30) CHR$(255) TAB(30 T+18);CHR$(250)
660 TIME=0
```

Vol 1 No 2 Page 18
Subchase

```
5 LET TH=5
186 LET BE=TAN (VTXT)
380 GOSUB 1000
600 UNPLOT INT (MIP 64)) 50
```

Vol 1 No 3 Page 9
Heli Driver

```
10 GOSUB 5000
60 DIM A$(54), P$(15) C$(14) G$(5) B$(18) M$(3)
800 ML=8 PRINT  38 spaces
```

Vol 1 No 3 Page 15
Scrabble Scorer

```
1118 PRINT AT 6, J 38 Q$(4,J)
1220 REM C=COUNT OF PLAYERS
1430 LET Z=SUM+(Z-26)
1500 LET B(R,A)=Z
5010 LET T(N)=T(N)+Z
1500 IF N<>2 OR P>2 THEN PRINT AT X(N,1),X(N,2) T(N)
5530 IF N=2 AND P=2 THEN PRINT AT X(1,1),X(1,2) T(N)
1540 NEXT N
1550 LET R=R+1
1560 GOTO 1310
4000 CLS
4050 PRINT Q$(1), Q$(2)
4000 IF P>2 THEN PRINT Q$(3)
4000 IF P>3 THEN PRINT Q$(4)
4000 PRINT AT 1 0 ——————————
4050 FOR J=1 TO R
4000 PRINT TAB 1,S(J,1) TAB(10) S(J,2)
4070 IF P>2 THEN PRINT TAB 18,S(J,3)
4000 IF P>3 THEN PRINT TAB 26,S(J,4)
4000 PRINT
4100 NEXT J
4110 STOP
4000 CLEAR
4055 SAVE "SCRABBLE"
4000 RUN
```

Vol 1 No 3 Page 21
Programming

```
50 FOR =CODE (Graphic 5) TO CODE (Graphic A)
60 IF B$(F5 I)= THEN GOTO CODE (Graphic V0)
```

Vol 1 No 4 Page 17
Space Pilot

```
370 LET P=INT(150/1000/2)
730 LET X=10-(INKEY$= 0") (the rest of the line remains the same)
```

Vol 1 No 4 P 23
Programming

Some of you noticed that the programs were missing from Barry Cornhill's article on chaining ZX81 programs in the 13 May 1982 issue. To put matters right here they are:

[illegible]

```
1 REM  VIC-ORAT R [illegible] 1982 KEN CLARK [illegible]
 REM***LOWER LIMIT TO PROTECT MEMORY [illegible]
 POKE51 [illegible] PEEK [illegible]
4 POKE55 [illegible] PEEK [illegible]
[illegible]
 REM***CLEAR [illegible] WHILE SETTING UP [illegible]
7 POKE [illegible]
8 REM***SET UP CHARACTER [illegible]
[illegible]
10 POKE 7120+I PEEK [illegible]
11 POKE 7120+I+1 PEEK [illegible]
[illegible]
1  IF [illegible] THEN [illegible]
14 REM***NEXT [illegible] DEFINED [illegible]
15 POKE [illegible]
16 POKE [illegible] PEEK [illegible]
17 REM***[illegible] PEEK [illegible]
18 POKE [illegible]
19 REM***[illegible] TEXT [illegible]
20 PRINT [illegible] CHARACTER [illegible]
  PRINT [illegible]
  PRINT POSSIBLE ON THE [illegible]
  PRINT [illegible]
  PRINT WITH A USER DEFINABLE
  PRINT
  PRINT CHARACTER SET
  PRINT [illegible]
  REM*** [illegible] SO HERE - THEN [illegible]
  GET [illegible] THEN [illegible]
  POKE [illegible]
  POKE [illegible]
  POKE [illegible]
  POKE [illegible]
4 POKE [illegible]
```

Vic-Orator
by Ken Clarke

PROGRAM OF THE WEEK

How long is a piece of string?

***David Lawrence** explains the use of character codes on the ZX81*

Lest ZX-81 owners should ever be tempted to forget the importance of the humble byte, here are three practical and elegant ways of handling strings which depend entirely upon the fact that a single string character can take any one of 256 forms.

First, the formatting of strings which have been stored in dimensioned arrays.

If you were to enter lines 20 to 50 of the demonstration program you would quickly discover that though you had intended to store FOX in line 1 of the array A$, what is actually stored there is FOX followed by 17 spaces. This is because the ZX 81 fills a dimensioned string array with spaces until the positions are used for something else. This could be overcome by changing A$(1) in line 50 to A$(1,1 TO 3) but the array may be intended to hold a large number of strings of different lengths to be fitted into a text at various points. What is needed is a simple method enabling the program to know how much of a dimensioned string is useful information and how much is padding.

An effective answer is illustrated by lines 60-80. Line 60, which could be used with any string up to 254 characters, simply tags a single character on to the front of the string — the CODE value of that character being equal to the length of the string plus the extra character. Line 80 now shows how the useful section of the string can be unerringly identified. A$ (2,2 TO CODE A$(2,1)) is the original B$ without its padding — in the case of FOX the character with a CODE value of 4 is tagged on to the front and the complex term boils down to no more than A$(2,2 to 4).

This technique of adding string length indicators can considerably add to speed and flexibility compared to commonly used methods such as examining the string character by character to assess its length.

ZX81

Our second usage for single character codes is in relation to the storage of data in long strings rather than in multi-dimensioned arrays. Suppose for instance that we have a large number of names to store and later access. This can be done by setting up an array with sufficient lines to take all the names. The problem is that if the longest name is likely to be 20 characters long then every line will have to be 20 spaces long, even though most of the other names will only need around 10 characters: a massive waste of memory space.

Using indicators

Alternatively the names can be stored in one long string, for instance Smith John Adams Bill Brown Allison. Hence no space is wasted but there is equally no way for the program to know where one name ends and the next begins. We could put a special marker such as an asterisk, in between the names but this would entail examining every character in the string whenever individual names had to be identified.

The section of the demonstration program starting at line 100 illustrates how a long string can be made up of individual entries each with an SLI tacked on to the front. Lines 200 onwards then show how much indicators can be used to retrieve items from the string. The loop at line 240 simply uses the SLIs to jump from the beginning of one item to the next until the correct item is reached. Line 260 is not more than a slightly more complicated version of line 80, except that instead of starting to print at position 2, we start at C+1, where C is the position of the SLI of the desired entry.

This section can be used with a little adaptation to produce an effective filing system, nor is it limited to single items of information such as names since within each entry further SLIs can identify sub-divisions such as name, address, telephone.

Finally, we shall examine how single character codes can aid in the production of well formatted interactive programs. The program section titled Typical Input Routine illustrates some of the functions that have to be performed when requesting information from the program user.

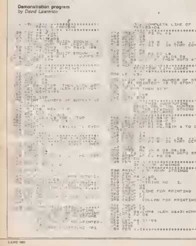
If the program contains many different requests for information, many of these functions can valuably be transferred to a single subroutine such as that from line 400 to line 560. Before this subroutine can be called, however, the string output requesting information will have to be specified (even if the same request has been made elsewhere) together with the position it is to be printed on the screen which, together with the line calling the subroutine, makes four lines for each call.

The effective use of single character codes is illustrated by the section from lines 570 to 760, which works on the assumption that A$ is a two dimensional array containing the questions to be printed. Each question has an SLI attached, followed by two bytes which indicate the screen position at which the string is to be printed. Further single characters could be included which would allow all the printing, whether or not an input is required, to be performed by the subroutine.

The codes themselves are simply attached by the use of a subroutine such as that found at line 280 (which would only be required during program development) and every code character replaces a line defining a variable in the program.

Perhaps the humble byte is not so humble after all.

mming



Demonstration program
by David Lawrence

This is why they called it Spectrum

Nick Hampshire discusses the colour commands on the ZX Spectrum

The Spectrum screen is organised as 24 lines of 32 characters and the character and background colour of each one of these 768 character spaces can be individually programmed to one of the eight possible colours which can be displayed by the Spectrum.

The two colours associated with each character space are the foreground or character colour, this is referred to as the ink colour, and the background colour or paper. In the normal power up mode the INK colour is black and the PAPER colour white.

There are eight different colours, including black and white, which can be displayed; they are as follows:

0 — black
1 — blue
2 — red
3 — purple or magenta
4 — green
5 — pale blue or cyan
6 — yellow
7 — white

These colours are produced on a colour tv by mixing just three primary colours — blue, red and green. Thus magenta, which is colour 3, is produced by mixing colours 1 and 2 — blue and red. Likewise colour 5, cyan, is a mix of colours 1 and 4, and colour 6, yellow, is a mix of colours 4 and 2.

From this you can see that the colour number is in fact the sum of the primary colours required to produce that colour. Thus white, which is produced by having all three primary colours mixed, has colour number 7 or colours 1 + 2 + 4.

The number associated with each colour on the above list is important since it is used in the colour commands to designate that colour.

The INK command is used to set the character or foreground colour of characters subsequently displayed using PRINT commands starting at the current cursor position. The command

```
INK 4: PRINT "ink colour green"
```

will print the statement "ink colour green" on the screen starting at the current cursor position in green characters on the existing background colour (normally white) of the screen. To show the range of colours try the following program:

```
10 FOR Q = 0 TO 7
20 INK Q
30 PRINT "ink colour number" Q
40 NEXT Q
```

The PAPER command is identical to the INK command except that it sets the background colour for the printed characters. Thus the command

```
PAPER 4: PRINT "paper colour is green"
```

will display the statement "paper colour is green" starting at the current cursor position and using the existing ink colour (normally black). The following short program shows the 64 different combinations of INK and PAPER colours which can be obtained:

```
10 PRINT "01234567 ink colours"
20 FOR Q = 0 TO 7
30 FOR Z = 0 TO 7
40 INK Z: PAPER Q
50 PRINT "*";
60 NEXT Z
70 PRINT "paper colour" Q
80 NEXT Q
```

Besides the foreground and background colours there is also the colour of the border around the screen display area. This border can have its colour set by use of the BORDER command followed by one of the eight colour code numbers. Thus

```
BORDER 5
```

will set the border to a cyan colour.

The original INK or PAPER colours can be retained for a character by setting the colour value to 8. This means that the characters printed following the command are "transparent" with the previously defined colours on the screen being used to display the new characters. Thus if the command

```
PAPER 8
```

is executed then the PAPER colour will be left as currently displayed on the text following the cursor. However, the INK colour will be that defined in the previous statement. Similarly the command

```
INK 8
```

will leave the INK colour unchanged but the PAPER colour changes to that defined in the previous colour definition statement. Both INK 8 and PAPER 8 can be used together to leave all colours unchanged.

There is a very poor contrast between some of the colours. For example it is virtually impossible to read a character which has an INK colour of cyan and a PAPER colour of green.

To overcome this and ensure enhanced character contrast there is an extra character code value. To do this you have to use the colour code number 9 after either the INK or PAPER commands.

These set the colour used with either the defined INK or PAPER colour to a colour with the maximum contrast. Thus if the colour is dark (eg black, blue, red or magenta) then the complimentary colour will be made white. If light, then the complimentary colour will be black.

All the fantastic colours (due to technical reasons here only in black and white)

Sound & vision



Beep-Beep, Beep Beep, yeeh!

Now that the initial excitement of the ZX Spectrum launch is out of the way and the computers are starting to get used, its functions are beginning to be explored. My first impression was quite good even though the machines I saw were pre-production models. There are a number of weaknesses but the machine is a vast improvement on its elder brother, especially to readers of this column who will be interested to hear that the Spectrum has sound.

Spectrum sound is governed by the BEEP command, which sounds silly but then so do PEEK and POKE. BEEP is used with two parameters; that is the word Beep is followed by two variables, which may be numbers or variable names, separated by a comma. The first one of these parameters governs the duration of the sound, the second its pitch. Duration is specified in seconds. I didn't have the opportunity to test the duration for accuracy, but at a guess it should be OK for most music. After all, notes don't usually extend beyond a couple of seconds.

The pitch variable is interesting. If it is given the value 0 then the pitch is that of middle C. Add one to get the next semitone, ie C sharp or D flat. Adding one always gives the next semitone up, subtracting gives the one lower.

The pitches are so organised to make an octave rise equal an extra twelve added to the pitch value. This continues to rise all the way up to a pitch value of around 73, way beyond my hearing, where an illegal parameter error message is given. I'm sure people can think up some good uses for the very high frequencies, such as disturbing bats and opera singers.

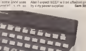
Another nice touch is that these pitches don't have to be integers — in other words quarter tones — and smaller pitch variations can be programmed. This gives rise to two more possibilities.

The first is the playing of Arabic or Chinese music where the scales are organised differently.

The second is tuning of the Spectrum to other musical instruments. This can be done by ear, adding tiny fractions as an increment until the pitches coincide.

It also raises the possibility of portamento between the notes.

It is quite likely that BEEP is not accurate over more than a couple of octaves, so this limitation should be kept in mind. Also I expect BEEP will be affected greatly by dirty power supplies. **Sam Blythe**



The BEEP key on the Spectrum is next to CAPS SHIFT



The colourful plot thickens

The graphics facility of the BBC Micro is such as to make it one of the most useful machines around, yet the very wide range of options, permutations and cunning tricks can get rather confusing.

This week we'll look at one of the most important graphics capabilities and how it can be used.

The feature is called XOR plotting — XOR standing for 'exclusive or'. You probably recognise this as a term from logic, to be grouped with others like AND, OR and NOT. Whilst the latter are fairly easily understood, XOR is more difficult to grasp.

What is easy to appreciate, however, is the fact that it applies to plotting a colour on the screen, and means that the colour you draw with is *modified* by the colour already there underneath it.

XOR plotting simply means that the computer does a quick check on the information already present in the bit of memory dealing with each pixel — individual dot — on the screen.

Normal plotting would just replace whatever information was there with new stuff — hence replacing the old colour with the new. Red might be changed to black, or white made yellow, for example.

But XOR plotting implies that if, say, red is laid over yellow, the result is a new colour altogether. Or — what's even more useful — if a colour is plotted on the screen in XOR mode, then plotted again, it disappears. What is more, it vanishes leaving whatever was underneath still intact!

Only a few other machines, such as the RML 380Z, can do this. They let you move shapes (or text) around over an already existing coloured background, leaving the original image just as it was before.

Here's how to use it. Having set up a graphics mode (try MODE 5), you can determine the colour of any plotting commands by the use of GCOL. GCOL needs two numbers following it, separated from each other by a comma. In *normal* use the first digit is 0, and the second is 0 to 3, which gives colours black, red, yellow and white (or their monochrome equivalents on a black and white tv).

So GCOL 0,3 means 'use colour 3 normally'. But change the 0 to a 3, and you're in XOR mode: GCOL 3,3 means 'use colour 3 in XOR mode'.

Next week I'll be presenting two programs — rather brain-damaging ones — using this and other graphics effects. This week, try the program on the left. **Brian Reffin Smith**

```
10 MODE 5
20 CLG  clear graphics area
30 FOR I=1 TO 1500
40 GCOL 3,1  REM plot in XOR red
50 GOSUB 100
60 GCOL 3,2  REM XOR yellow
70 GOSUB 100
80 NEXT I
90 END
100 REM plot lines
110 X1=RND(1280)  Y1=RND(1023)
120 X2=RND(1280)  Y2=RND(1023)
130 FOR J=1 TO 2
140 MOVE X1,Y1  DRAW X2,Y2
150 NEXT J
160 RETURN
```

Peek & poke

Peek your problems to our address Ian Beardsmore will poke back an answer

A QUESTION OF INTERPRETATION

David Geach of Gruinard Road, Ross-on-Wye writes.

Q I am fairly new to computing using a second hand Atom at the moment. Slowly I am learning the jargon but two things are still confusing me. These are Compiler and Interpreter. I do not seem to understand several descriptions that I have read. If anything it makes things seem more complex. Could you please explain them?

A A compiler de-codes a program in a high level language such as Basic or Cobol into machine code or an assembly language. Initially this is comparatively slow. Nevertheless once it has been done the program will RUN faster than an interpreter program. This is because the de-coded program will be stored in the memory.

An interpreter does essentially the same except that each statement is done individually and not stored. So each statement has to be re-read and re-coded each time it is used. The advantage of the interpreter is that it uses less memory as no interim program has to be stored. The disadvantage is that it takes more time. Obviously the sequential re-reading needed for the interpreter takes more time to RUN than the stored de-coded program of the compiler.

IT'S ALL PART OF THE EDUCATION

R. Daniels of [illegible], Dorset writes.

Q At the recent computer fair in Earls Court, I heard the name MUSE on two different occasions. No one I have asked seems to have heard of them beyond someone who said that they had heard of them and EZUG but did not know what they were. I haven't a clue. Have you?

A Yes. MUSE stands for Micro Users in Secondary Education while EZUG stands for Educational ZX Users Group. As you can guess they are both concerned with computers in the school. EZUG was formed out of MUSE and I gather that each groups are quite active within education having their own news letters and software libraries.

THIS SHOULD RAM IT ALL HOME

Nick Starking of Caister on Sea, Norfolk writes:

Q I am writing to you in the hope that you can answer a question (well two really) for me. I am interested in the Commodore Vic 20 but I feel that the 3.5K RAM is too small. I hear that extra RAM is available but my query is this. Do the 3K, 8K and 16K RAM cartridges for the Vic 20 fit inside the computer or is an expansion unit (like the Atari Expansion Unit) necessary?

Also I have read about the introduction either later this year or early next year of the Vic 20/16 a 40-column 16K RAM computer which is a big brother to the Vic 20, and the Commodore 64/40 a 40-column 64K RAM computer which will sell for about £395. Is there an approximate price available for the Vic 20/16?

A The extra RAM cartridges for the Vic 20 are external however a memory expansion port is already supplied so an expansion unit is not needed unless you want to add other peripherals as well. As for the new Vics, if you look at your third issue of *Popular Computing Weekly* you will find your question answered on page 5. The Vic-20/16 is in fact the Vic 30. Cost will be about £250 and it is due to be launched in January next year.

PUT MORE POKE IN YOUR RACER

J. R. J. bases of Tottenham London writes.

Q I have had a BBC model B micro since early this month and now I'm writing a *Grand Prix* game. I have tried tabbing the cars on to the screen but this slows the game down. I would prefer to PEEK and POKE to and from a screen location. Could you tell me and many other BBC owners how to use PEEK and POKE to and from a screen location?

A The first thing that has to be done is that the SCROLL function has to be stopped or at least controlled by setting up a text window. This still scrolls the screen but the VDU RAM locations do not change. Enter this:

VDU 28,0,24,0,30,0

This sets up a screen window for the entire screen. To POKE use the following:

?(HIMAN + x + y*40) ASC" character you want

Here x and y are the co-ordinates that you want. To PEEK use the following:

CH=?(HIMAN + x + y*40)

This makes CH equal to whatever is at x,y. When you want to bring the character on to the screen just enter the line:

CH$=CHR$ CH

STRICTLY FOR THE KNOB TWIDDLER

E. W. Bailey of Hampstead London NW3 writes.

Q As a display for my ZX81 I am using a Toshiba model 107B battery mains portable with a 9in screen. It has an integral loop antenna marked and a coaxial socket marked into which I plug my ZX81. My problem is that no amount of tuning or setting of the contrast or brilliance controls gives me a clean background but a pattern of alternating light and dark lines persists over the usable area. Can you help me?

A Several things could be the source of the trouble but no one factor presents itself as the most likely cause of the problem. There are two important things that you do not say in your letter. Have you tried your ZX81 with another television or another ZX81 on your portable? Also I would guess that when you say background that you are at least getting a cursor. If the tuning is all right then two possible causes are the power unit and the coax aerial lead.

The power supply jack can be very fickle on both the ZX80 and 81; try twiddling this in and out. The smallest increment in the right direction can make a vast difference. In the same way check your video lead. When I first got mine the two wires inside one of the plugs were so badly wired that the slightest pressure would cause them to touch with all the attendant screen decay.

I would have thought that the internal antenna would be cut out as soon as an external lead was connected but my hardware knowledge particularly of televisions is not all it might be. Try using another television or computer that will help reduce the number of possible causes of your troubles. Then try checking all the leads making sure the power lead does not cross the signal lead. If you are using a RAM Pack try it without the Pack as they usually add to problems like this.

If you still do not get any luck then all I can suggest is that you go to your local electrical shop and ask their advice and possibly if you might try out your computer on one or two other models.

If you still get the same sort of problem then it would seem that the frequency modulator in the ZX81 is at fault which will mean a return to Sinclair Research. If it works with other televisions then your Toshiba is the cause and I could not tell you how to rectify that.

● *Stop agonising over that problem. Write to Ian Beardsmore, Peek & Poke, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF*

Competitions

Puzzle No 7

One of the simple is at our summer fete was attracting some attention. Called Lucky Seven, it was the simplest of games requiring only nine wooden discs — each one of which was numbered on the other from 1 to 9.

The nine discs were placed face down on a table and were mixed up. For the payment of a 10p stake you could pick up four of the discs at random, which were then turned over to reveal the digit printed on the reverse. The person in charge would then arrange these four digits to form one four-digit number. If that number was divisible by seven then you lost 10p. If however it was impossible for a multiple of seven to be formed then you would win £1.

How would you assess the odds against winning this game? (Of course upside down or inverting the six and nine are not allowed.)

Solution for June 4

In order for a man to divide the pile of coconuts into equal fifths and have one left over for the monkey the formula is:

$$A = 4/5 (B - 1)$$

where B equals the number the pile originally contained and A those remaining after the division. A and B, of course, must be integers. By rearranging the equation we get

$$B = (5A/4) + 1$$

In order for the second man to be able to divide those remaining nuts equally (and have one left over for the monkey) B − 1 must also be exactly divisible by five. If it is we can repeat the procedure, and so on.

As the first number of nuts must be a multiple of five we start with this number and increase by five each time. (To find the answer to part (b) of the question then we must also with a minimum of six to have one left over.)

```
10 LET M = 5
20 LET N = 6
30 LET A = N
40 LET B = 5*A/4 + 1
50 IF (B-1)/5 = INT((B-1)/5) THEN GOTO 100
60 LET N = N + 5
70 GOTO 30
100 LET M = M + 1
110 IF M = 5 THEN PRINT B
120 IF M = 5 THEN STOP
130 LET A = B
140 GOTO 40
```

Run this and you get (a) 3121 coconuts (b) 15,621 coconuts.

Winner of Puzzle No 3

The winner is David Robinson, Montgomery Hill, Frankby, Wirral, who receives £10.

Solution to Crossword No 6

Across. 3 CPU 6 Adder 9 Shampoo 10 Chip 11 Gaskin 13 Lie low 14 Duplex 17 Tropical 19 Anal 21 Real Ale 22 Metro 23 Up

Down. 1 Calculators 2 Odd cod 3 Cry 4 Users 5 Eardrum 6 Spar 7 For next loop 12 Nominal 15 Length 16 Panel 18 Opal 20 Amp

Winner of Crossword No 5

The winner is D D R Sibbald, St. George's Road, Bond, Essex, who receives £10.

Rules

The winner for the crossword and the winner of the puzzle will be the first name out of the hat (in each case).

Closing date for both the crossword and puzzle is the Monday, [illegible] weeks after cover date.

Crossword No 7

Across

3 Program [illegible] inputs with ... (6)
5 Program the company in ... (7)
10 Program to change ... (4)
11 Program to translate ... chip, with ... (6)
13 Program for ... and ... (7)
14 Three, to start with, ... (6)
17 Program a ... (5)
19 Program ... Storage ... 7A (4)
21 Program ... (7)
22 Disable ... in a week (5)
23 Storage ... (6)

Down

1 Program to ... (11)
2 Computing ... (7)
3 A ... (3)
4 Program Storage ... page ... (1 1 1 1)
5 ... (4,3)
6 Storage unit for ... (4)
7 ... (7-4)
12 ... (5,3)
15 ... of an input device (5)
16 ... engineer (6)
18 ... (4)
20 Tool ... (3)



